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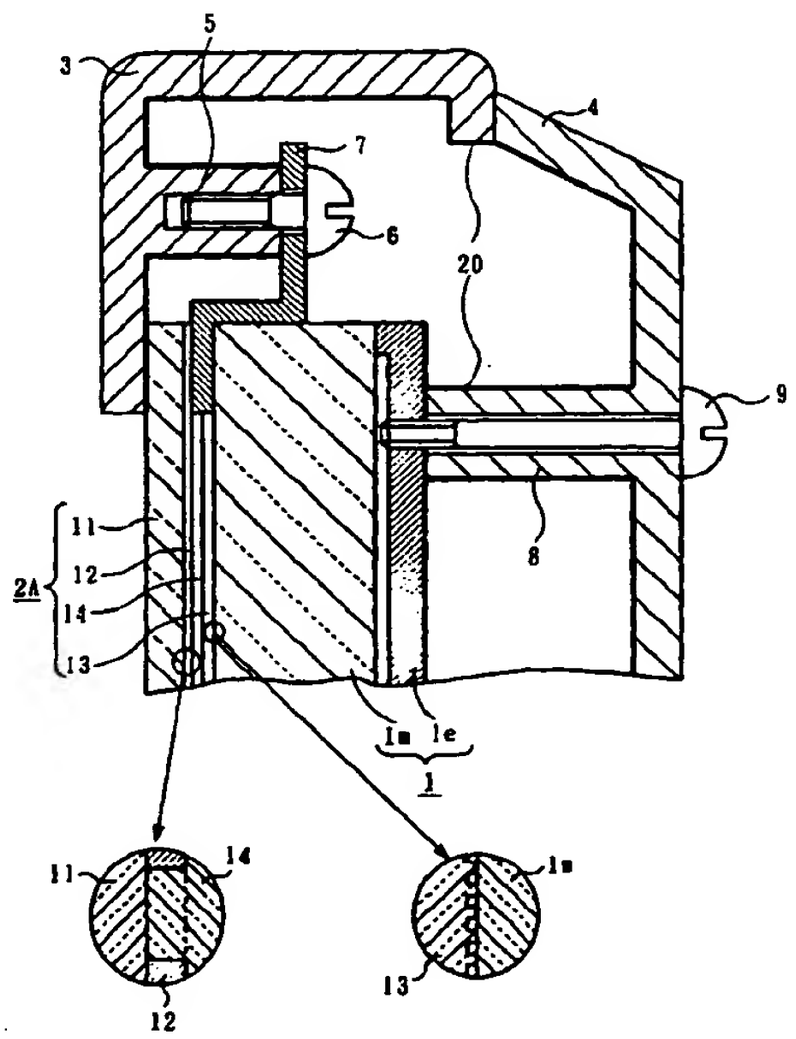
# (54) FILTER FOR PREVENTING LEAKAGE OF ELECTROMAGNETIC WAVE

(57) A filter 2A(2C) which prevents the leakage of electromagnetic waves from a PDP 1, and is provided with a filter base 11 in front of the PDP 1 and grounded conductive mesh 12 which transmits light on the base 11 on the PDP 1 side. Alight scattering layer 13 is bonded to the mesh 12 with a conductive adhesive 14 which transmits light, and the spaces of the lattice (when the base 1 exists) of the mesh 12 are filled with the adhesive 14 so that, when electric charge is induced in the mesh 12 by a pulse voltage applied to the PDP 1 for write/erase, the voltage across the lattice of the mesh 12 is made nearly equal to the potential of the mesh 12 so as not to cause electric discharge and generate noise. Alternatively, a transparent antistatic layer 22 is provided between the PDP 1 and the mesh 12 so as not to generate noise by lowering the pulse voltage applied to the PDP 1 for write/erase to such a low value that no electric discharge occurs when electric charges are induced in the mesh 12 by the pulse voltage.

Fig. 6

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## Description

### TECHNICAL FIELD

**[0001]** The present invention relates to an electromagnetic wave leakage preventing filter with a filter base provided on the frontal face on an image displaying portion, wherein a light transmitting conductive mesh is mounted on the surface of the image displaying portion side of the filter base, and the conductive mesh is grounded to keep the electromagnetic wave from the image displaying portion from leaking out.

### BACKGROUND TECHNOLOGY

**[0002]** The image displaying portion used in an image display includes a gas discharging display panel, for example, the plasma display panel (hereunder referred to simply as "PDP"). The PDP excites the molecules of the gases sealed up inside by discharging between the electrodes (more materially, it mixes up the xenon gas and neon gas, and brings assistance to the excitation of the xenon gas molecules), excites further the fluorescent substance coated inside by the ultraviolet radiation generated, emitting thus the visible light to display an image. The discharging and the like under these conditions however generate an electromagnetic wave allowing it to leak out, though small in quantity.

**[0003]** To prevent this electromagnetic wave from leaking out, an optical filter provided on the frontal face of the PDP to intercept the wavelength in the near infrared region is endowed with an electromagnetic wave leakage preventing feature.

This function to prevent the electromagnetic wave from leaking out is achieved by providing, as shown in Figures 1 and 2, the filter base 11 consisting of such synthetic resin plate as acrylic, the base material of the optical filter (referred to simply as "filter"), with a web-like formed conductor (referred to simply as "conductive mesh 12"). As shown in Figure 3, the conductor width and intervals of the grids of the conductive mesh 12 have been set to their optimal values so that the conductive mesh as grounded may cover the frequency range of the electromagnetic wave to be prevented from leaking and may not interfere with the image light. That is, the electric charge excited at the conductive mesh 12 by the electromagnetic wave is grounded by connecting this conductive mesh 12 to the enclosure of the PDP with the orientation of the mesh set obliquely, as shown in Figures 2 and 3, so that the matrices of the PDP pixels should not overlap the mesh conductor to intercept the image light.

**[0004]** Note here that the PDP applies about 350 V of pulse voltage between the electrodes at predetermined period required for write/erase (the data of all the pixels is erased all at once to write a new image data into respective pixels).

Since the filter 2 is arranged in the vicinity of the frontal face of the PDP, the frontal glass of the PDP and the filter 2 come into a status of capacitive coupling, said pulse voltage for write/erase generates an electric charge under said required period at the conductive mesh 12 of the filter 2 through the coupled capacity. Though this electric charge produces an instantaneous voltage (approx. 140 V max. as measured) between the conductive mesh 12 and the ground due to the impedance of a grounded circuit, the voltage of the conductive mesh 12 as continued to the ground becomes 0 V. Because, on the other hand, the electric charge imparts itself to the portion 41 as surrounded by the grids of the conductive mesh 12 (where there exists an acrylic adhesive) as shown in Figure 3, together with this generation of the instantaneous voltage (about 140 V), the charge remains even after the voltage of the conductive mesh 12 becomes 0 (zero). The charged portion being within point-blank range of the conductive mesh 12, it surpasses the withstand voltage to discharge (sparks) instantaneously toward the conductive mesh 12 at the same time when the voltage of this latter lowers down to 0 V.

**[0005]** When, for example, the PDP is of AC (alternative current) driven type, the image signal is of NTSC system, and one field is divided into six subfields for driving, then the repeated (required) frequency of the voltage generation of the conductive mesh 12 is about 360 Hz (60 fields x 6 subfields = 360 Hz) with the discharging repeated at about 360 Hz too, and accordingly the spark noise is heard as an abnormal noise.

**[0006]** The present invention, contrived in the light of the foregoing problematical points, is intended to keep any abnormal noise due to the discharging of imparted charge from occurring by reducing the electric charge as excited at the conductive mesh 12 or else by preventing the charge from imparting itself between the grids of the conductive mesh 12 (region where the filter base exists, including the portion 41 surrounded by the grids themselves; the same will prevail for the following texts) when the pulse voltage as applied to the image displaying portion (the pulse voltage applied to the PDP for write/erase, for instance) excites an electric charge at the conductive mesh 12.

### DISCLOSURE OF THE INVENTION

**[0007]** The electromagnetic wave leakage preventing filter according to the present invention is characterized in that a filter base is provided on the frontal face of an image displaying portion (a PDP, for example), a light transmitting conductive mesh is mounted on the surface of the image displaying portion side of the filter base, and this conductive mesh is grounded, adhering, on this conductive mesh, a light scattering layer intended to expose the exterior light to irregular reflection by means of a light transmitting conductive adhesive.

**[0008]** When an electric charge is excited on the conductive mesh by the electromagnetic wave coming from

the image displaying portion this electromagnetic wave cannot leak out because the conductive mesh is grounded.

**[0009]** Because the conductive adhesive fills up the grids of the conductive mesh electrifying them, the pulse voltage as applied on the image displaying portion (for example, the pulse voltage applied to the PDP for write/erase) excites an electric charge at the conductive mesh. When this charge continues to the ground, the voltage between the grids of the conductive mesh comes always to be the same potential as the conductive mesh, avoiding thus the discharge and correspondingly any abnormal noise.

**[0010]** The light scattering layer reflects irregularly the exterior light incidental to the image displaying portion from the exterior, exhibiting thus a glare shielding effect (namely, the glare is prevented).

**[0011]** The electromagnetic wave leakage preventing filter by the present invention is characterized in that a filter base is provided on the frontal face of an image displaying portion (for example, PDP), a light transmitting conductive mesh is mounted on the surface of the image displaying portion side of the filter base, the conductive mesh is grounded, and a transparent antistatic layer is provided between this image displaying portion and the conductive mesh.

**[0012]** As in the case of the foregoing invention, the conductive mesh as grounded does keep the electromagnetic wave coming from the image displaying portion from leaking out.

**[0013]** Since a transparent antistatic layer is given between the image displaying portion and the conductive mesh, even if the pulse voltage to be applied to the image displaying portion (for example, the pulse voltage applied to the PDP for write/erase) excites an electric charge on the conductive mesh, this voltage lowers down, preventing thus any discharge and consequently any abnormal noise.

## BRIEF SUMMARY OF THE DRAWINGS

**[0014]**

Figure 1 represents an elevational cross section of the essential part of a conventional electromagnetic wave leakage preventing filter.

Figure 2 is a top view of the essential part as shown in Figure 1.

Figure 3 is a fragmentary enlarged view of Figure 2.

Figure 4 is a schematic diagram of the electromagnetic wave leakage preventing filter as mounted on a display according to an embodiment of the present invention

Figure 5 represents an elevational cross section of the essential part of the electromagnetic wave leakage preventing filter as shown in Figure 4 with a fragmentary exploded view thereof.

Figure 6 is a grossly enlarged view of a part of the filter shown in Figure 4 with further greatly enlarged views of the parts thereof.

Figure 7 depicts an elevational cross section of the essential part of an embodiment wherein an AR film is provided on the electromagnetic wave leakage preventing filter as shown in Figure 5.

Figure 8 is another enlarged view of the essential part of the electromagnetic wave leakage preventing filter as mounted on a display according to another embodiment of the present invention

Figure 9 illustrates an elevational cross section of the essential part of the electromagnetic wave leakage preventing filter shown in Figure 8 with a partial exploded view thereof.

Figure 10 depicts an elevational cross section of the essential part of an embodiment wherein AR film and AG/AR film are provided on the electromagnetic wave leakage preventing filter as shown in Figure 9.

Figure 11 illustrates an elevational cross section of the essential part of an embodiment wherein a primer coat is applied on the electromagnetic wave leakage preventing filter shown in Figure 10.

## BEST FORM TO EXECUTE THE INVENTION

**[0015]** Referring now to attached drawings, we will describe in detail the present invention, especially the first embodiment of the present invention referring to Figures 4 to 6.

**[0016]** In Figure 4, the numeral 1 represents a PDP, 2A an electromagnetic wave leakage preventing filter (referred to simply as "filter"), 3 the frontal portion of an enclosure, and 4 the rear portion of the same enclosure. Attached to the periphery of said filter 2A are the mounting brackets 7, which are fastened into the mounting bosses 5 to 5 of the frontal portion of the enclosure 3 with the screws 6 to 6 to fasten the filter 2A to the frontal portion of the enclosure 3. The PDP1 is fixed to the rear portion of enclosure 4 with the screw 9 to 9 through the mounting bosses 8 to 8. Mounting the rear portion of enclosure 4 on the frontal portion of enclosure 3 enables to attach the periphery of the PDP1 to the mounting brackets 7, which are made forcibly to contact the filter 2A so that they may come into close contact with the conductive mesh 12 (to be described later in this text) pulled out from the periphery of the filter 2A.

A conductive coat 20 as shown in Figure 6 is formed making conductive the mounting bosses 5 to 5, the inner face of the frontal portion of enclosure 3, the inner face of the rear portion of enclosure 4, and the mounting bosses 8 to 8. Through this conductive coat 20, the conductive mesh 12 is connected to the metallic portion (ground) 1e on the back of the PDP1, and the electric charge excited on the conductive mesh 12 by the electromagnetic wave radiated from one meter of the body of the PDP 1 is conducted to the ground through the grounding terminal 10.

[0017] As shown in Figures 5 and 6, said filter 2A comprises the filter base 11, the conductive mesh 12 provided on one face of this filter base 11, the AG (Anti-Glare) film 13, and the conductive adhesive 14 intended to adhere the AG film 13 on the conductive mesh 12, electrifying at the same time the grids of the conductive mesh 12.

[0018] Said filter base 11 has been so formed that a fluorescent substance for emitting blue light does absorb the red color component slightly emitted in addition to the blue color by mixing a colorless, transparent and impact resistant synthetic resin such as acrylic or polycarbonate with a pigment for the selective absorption filter that absorbs the red color component to complement the light color emitted from the PDP1. Further, said filter base 11 has been so formed that it has a near infrared radiation absorbing filter layer (not shown) which absorbs the line spectrum (an example of particular visible light) released from the PDP1 in the near infrared region (800 nm to 1000 nm) and that consequently there should arise no interference with an infrared radiation remote controller or optical communication equipment to be installed in the peripheral area.

[0019] Said conductive mesh 12 is formed by electroless plating of such metal as copper into required thickness (0. 1 μm, for example) on the filter base 11 through a resist layer, another electroless plating of such metal as nickel thereon into required thickness (100 Å, for example), and yet further by photoresist thereon. Any resist other than on the mesh conductor will then be removed by ultraviolet rays. Finally etching finishes the conductive mesh 12. The screen size and pixel pitch of the PDP1 are to be taken into account so that any visible light may well be transmitted and the electromagnetic wave may be intercepted in the frequency range of 30 MHz to 130 MHz to set, as shown in Figure 3, the conductor width (15 μm) and conductor intervals (127μm) in such a fashion that any electromagnetic wave within said frequency range may be shielded. Further, the orientation of the mesh is slanted by 45° so that the mesh should not overlap the rows/columns (vertical/horizontal) of the pixels of the PDP1 hindering the image. By electroless plating of such metal with high conductivity as copper and copper nickel on a mesh fabric of synthetic resin, the conductive mesh 12 may be made into metallic woven fabric, and adhered to the filter base 11, or else may be sandwiched by the layers of the filter base 11 as divided into two. Due to the thinness of the mesh (that is, conductor width) being limited, the metallic woven fabric is not suited to any PDP1 with small caliber, but is effective for any large caliber of 40 to 50 inch type, for example.

[0020] As shown in Figure 6, the fragmentary enlarged view, said AG film 13 is an example of light scattering layer, which forms minute ruggedness on the surface of a colorless, transparent film, scatters by irregular reflection the light from, for example, a lighting fixture to thus prevent any glare and overlap with the image of PDP1, which makes it difficult to view the screen, Said AG film 13 is adhered to the conductive mesh 12 by means of the conductive adhesive 14.

[0021] Said conductive adhesive 14 consists of the mixture of acrylic adhesive with the fine particles, as a mixture, of conductive metallic oxides such as stannic oxide and antimony to endow it with conductivity.

[0022] As shown in Figures 4 and 6, the filter 2A is mounted on the frontal face of the PDP1 with the AG film 13 side brought to the PDP1 side, is electrified with the pullout portion of the conductive mesh 12 made to attach to the mounting bracket 7, and the conductive mesh 12 is connected to the ground all through the mounting bracket 7, conductive coat 20, metallic portion 1e and through the grounded terminal 10. By opposing the AG film 13 against the PDP1, the filter 2A does not come into close contact with the surface of the PDP1 due to the rugged surface of the AG film 13 when the filter 2A is made to contact the frontal face of the PDP1, thereby enabling to prevent the generation of Newton's rings (bright and dark concentric circles).

[0023] Since, as has thus far been described, the filter 2A by the present invention makes it possible that the grids of the conductive mesh 12 (where the filter base 11 is) provided to prevent the electromagnetic wave leakage of the PDP1 are filled with the conductive adhesive 14, the pulse voltage to be applied onto the PDP1 for write/erase excites an electric charge on the conductive mesh 12, when the voltage between the grids of this conductive mesh 12 is always at almost the same potential with that of the conductive mesh 12 itself, thereby avoiding any electric discharge and accordingly any abnormal noise.

[0024] In case where the conductive adhesive 14 is not applied on the conductive mesh 12 as with the prior art, the write/erase of the PDP1 excites on the conductive mesh 12 about 140 V of electric charge, which is imparted to the portion 41 surrounded by the grids of this conductive mesh 12 as shown in Figure 3. This charge of the conductive mesh 12 will remain because of the filter 2, which is no other than a high insulator, even after it flows into the ground to be 0 V through the mounting bracket 7. It discharges toward the conductive mesh 12, which is now at 0 V. Conversely, in the case of the embodiment of the present invention as shown in Figures 4 to 6, the conductive adhesive 14 is applied onto the conductive mesh 12, penetrating in between the grids of the conductive mesh 12, which are therefore electrified. Thus, the voltage between the grids (including the portion 41 surrounded by the grids) always remains almost at the same potential with that of the voltage of the conductive mesh 12 without, therefore, any electric discharge nor any abnormal noise.

[0025] Figure 7 shows an embodiment of the present invention where the filter 2B is formed by adhering AR (Anti-Reflection) film 21 on the external face of the filter base 11 (lower portion in the figure) in the filter 2A

shown in Figures 4 to 6. Said AR film 21, which is an example of light reflection preventing layer, is made by the vacuum evaporation of plural superposed films from materials of different refractive indices, on the surface, for example, of a transparent film or by the application of a fluororesin into film. The light incidental to the filter body is exposed to complex refraction to make it difficult for the light to return back forward circumventing thus the decrease in the contrast of the image due to the reflection of exterior light.

**[0026]** Next, we will explain the second embodiment of the present invention referring to Figures 8 and 9.

**[0027]** In Figures 8 and 9, like numerals and characters represent like parts as in Figures 4 to 6, omitting a part of description In these figures, the numeral 1 represents a PDP, 2C an electromagnetic wave leakage preventing filter (referred to simply as "filter"), 11 a filter base, 12 a conductive mesh provided on one face of the filter base 11, 22 an antistatic layer, and 23 an adhesive intended to adhere the antistatic layer 22 on the conductive mesh 12.

**[0028]** To form said antistatic layer 22, such conductive metallic oxides as stannic oxide and antimony are mixed into fine particles, and then this mixture is dissolved into required solution, for example, the mixed solution (antistatic agent) of pure water, alcohol and surface active agent. Spraying this new solution on a colorless, transparent film or applying it by the bar coat method allows to generate the antistatic layer whose surface resistivity is of the order of 6 powers of 10 ohms per square centimeter. The antistatic layer 22 thus made is adhered onto the conductive mesh 12 of the filter base 11 with the acrylic based adhesive 23 so as not to impart any electric charge in between the grids of the conductive mesh 12 (where the filter base 11 is).

**[0029]** With this filter 2C thus far described, there comes the antistatic layer 22 between the PDP1 and the conductive mesh 12 provided to prevent the electromagnetic wave leakage of the PDP1. Even if the pulse voltage as applied on the PDP1 for write/erase excites an electric charge on the conductive mesh 12, such voltage remains low, leading thus to no discharge and no abnormal noise.

**[0030]** In any prior art without this antistatic layer 22, the electric charge does remain due to the filter 2, which is a high insulator, even after about 140 V of charge is excited on the conductive mesh 12 by write/erase of the PDP1, and this charge is imparted to the portion 41 surrounded by the grids of the conductive mesh 12 as shown in Figure 3, and the charge of the conductive mesh 12 flows into the ground to be 0 V through the mounting bracket 7. It then discharges toward the conductive mesh 12, which is now at 0 V. Conversely, in the embodiment of the present invention as shown in Figures 8 and 9, the provision of the antistatic layer 22 between the PDP1 and the conductive mesh 12 realizes a state as if electrodes were inserted between the PDP1 and the antistatic layer 22, said 140 V being divided (voltage ratio as inversely proportional to the volume percentage) by the capacity between the PDP1 and the antistatic layer 22 as well as that between the antistatic layer 22 and the conductive mesh 12, and consequently the charge as excited on the conductive mesh 12 decreases to a value lower than 140 V, a voltage preventing the discharge.

Hence, there will be no discharge nor abnormal noise.

**[0031]** Figure 10 illustrates an embodiment where, in the filter 2C shown in Figure 9, the antistatic layer 22 is formed on the AG/AR film and the AR film is adhered onto the external face side (lower portion in the figure) of the filter base 11 to form the filter 2D.

**[0032]** Said AG/AR film 24, which is an example of light scattering/reflection preventing film, results from a formation of fine ruggedness on the surface of a colorless, transparent film with a light coming, for example, from a lighting fixture scattered irregularly to avoid any glare and the overlap with the image of the PDP1, which makes it difficult to have a clear view of the picture. Vacuum evaporation, on this AG/AR film 24, of plural superposed films from materials of different refractive indices, or application of a fluororesin on this AG/AR film 24 allows to have a film at which the incidental light is exposed to complex refraction to make it difficult for the light to return back to the incidental direction. The AR film 21 is formed from the vacuum evaporation of plural superposed films made of materials of different refractive indices or application of fluororesin on a transparent film, exposing the light incidental to the filter body to complex refraction so that it becomes difficult to go back forward, preventing thus the reduction in contrast of the image due to the reflection of exterior light.

**[0033]** Figure 11 shows up an embodiment of the invention where in the filter 2D shown in Figure 10, the AG/AR film 24 is applied, on its surface, a primer coat (that is undercoated) to form a primer coat layer 25, on which an antistatic layer 22 is formed to make the filter 2E. This is because when a fluororesin is applied for AR treatment of the AG/AR film 24, the antistatic agent is repelled by the fluororesin film, which hinders a good adhesion. This necessitates therefore to apply beforehand a surface active agent (primer coating) on the surface of the AG/AR film 24. Other configurations being the same with those in Figure 10, we omit the description thereof.

## INDUSTRIAL AVAILABILITY

**[0034]** As has so far been described, the electromagnetic wave leakage preventing filter by the present invention, which can be used to circumvent the leakage of the electromagnetic wave from a display (PDP display, for example), is suited to it that when the pulse voltage to be applied to the image display portion (for example, the pulse voltage to be applied on the PDP for write/erase) excites an electric charge between the grids of the conductive mesh provided for inhibition of

the electromagnetic wave leakage, the charge thus excited does not lead to any discharge nor to any abnormal noise.

## Claims

1. An electromagnetic wave leakage preventing filter characterized in that a filter base is provided on a frontal face of an image displaying portion, a light transmitting conductive mesh is mounted on the surface of the image displaying portion side of the filter base, the conductive mesh is grounded, and a light scattering layer intended to expose any exterior light to irregular reflection is adhered on the conductive mesh by a light transmitting conductive adhesive.

2. The electromagnetic wave leakage preventing filter as claimed in Claim 1, characterized in that said light scattering layer results from the formation, on the surface of a colorless, transparent film, of fine ruggedness intended to expose the exterior light to irregular reflection.

3. The electromagnetic wave leakage preventing filter as claimed in Claim 1 or 2, wherein the filter base comprises an emitted light color complementation feature that absorbs particular visible light to complement the light emitting color from an image displaying portion and an invisible light shielding feature that absorbs particular invisible light released from the image displaying portion

4. The electromagnetic wave leakage preventing filter as claimed in Claim 3, wherein a filter base is provided with a light reflection preventing layer that avoids any reflection of exterior light.

5. An electromagnetic wave leakage preventing filter characterized in that a filter base is provided on the frontal face of an image displaying portion, a light transmitting conductive mesh is provided on the surface of the image displaying side of the filter base, the conductive mesh is grounded, and a transparent antistatic layer is provided between the image displaying portion and the conductive mesh

6. The electromagnetic wave leakage preventing filter as claimed in Claim 5, wherein the light scattering/reflection preventing film is adhered on the conductive mesh, and an antistatic layer is provided on the light scattering/reflection preventing film.

7. The electromagnetic wave leakage preventing filter as claimed in Claim 6, wherein the anti static layer is formed by applying a transparent antistatic agent on the light scattering/reflection preventing film.

8. The electromagnetic wave leakage preventing filter as claimed in Claim 6, wherein the anti static layer is formed by applying the transparent antistatic agent on the face of the light scattering/reflection preventing film after the pretreatment with application of a surface active agent.

9. The electromagnetic wave leakage preventing filter as claimed in Claim 5, 6, 7 or 8, wherein the filter base comprises, on its colorless, transparent synthetic resin substrate, a light emitting color complementation feature that absorbs particular visible light to complement the light emitting color from the image displaying portion and an invisible light shielding feature that absorbs any particular invisible light released from the image displaying portion

10. The electromagnetic wave leakage preventing filter as claimed in Claim 9, wherein the filter base is provided with a light reflection preventing layer that avoids the reflection of exterior light.

## Amended claims under Art. 19.1 PCT

1. (Amended) An electromagnetic wave leakage preventing filter, wherein a filter base is provided on the frontal face of an image displaying portion, a light transmitting conductive mesh is mounted on the surface of the image displaying portion side of the filter base, and the conductive mesh is grounded, characterized in that a light scattering layer intended to expose any exterior light to irregular reflection is adhered on the conductive mesh by a light transmitting conductive adhesive.

2. (Amended) The electromagnetic wave leakage preventing filter as claimed in Claim 1, characterized in that said light scattering layer result from the formation, on the surface of a colorless, transparent film, of fine ruggedness intended to suppress the generation of Newton's rings.

3. The electromagnetic wave leakage preventing filter as claimed in Claim 1 or 2, wherein the filter base comprises an emitted light color complementation feature that absorbs particular visible light to complement the light emitting color from an image displaying portion and an invisible light shielding feature that absorbs particular invisible light released from the image displaying portion.

4. (Deleted)

5. (Amended) An electromagnetic wave leakage preventing filter, wherein a filter base is provided on the frontal face of an image displaying portion, a light transmitting conductive mesh is provided on the surface of the image displaying side of the filter

base, and the conductive mesh is grounded, characterized in that a transparent antistatic layer is provided between the image displaying portion and the conductive mesh.

6. (Amended) The electromagnetic wave leakage preventing filter as claimed in Claim 5, wherein the light scattering/reflection reflection preventing film formed by creating fine ruggedness intended to suppress the generation of Newton's rings is adhered on the conductive mesh, and an antistatic layer is provided on the light scattering/reflection preventing film.

7. The electromagnetic wave leakage preventing filter as claimed in Claim 6, wherein the antistatic layer is formed by applying a transparent antistatic agent on the light scattering/reflection preventing film.

8. The electromagnetic wave leakage preventing filter as claimed in Claim 6, wherein the antistatic layer is formed by applying the transparent antistatic agent on the face of the light scattering/reflection preventing film after the pretreatment with application of a surface active agent.

9. The electromagnetic wave leakage preventing filter as claimed in Claim 5, 6, 7 or 8, wherein the filter base comprises, on its colorless, transparent synthetic resin substrate, a light emitting color complementation feature that absorbs particular visible light to complement the light emitting color from the image displaying portion and an invisible light shielding feature that absorbs any particular invisible light released from the image displaying portion

10. The electromagnetic wave leakage preventing filter as claimed in Claim 9, wherein the filter base is provided with a light reflection preventing layer that avoids the reflection of exterior light.

Fig. 1

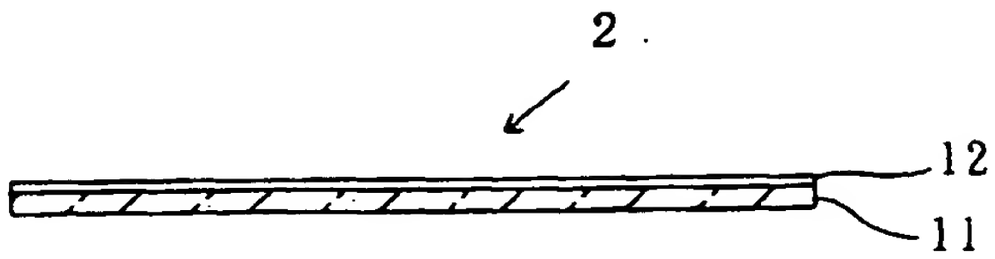



Fig. 2

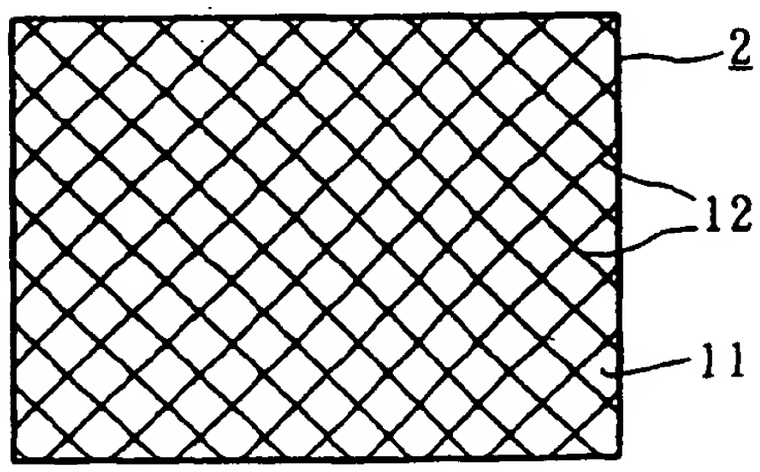


Fig. 3

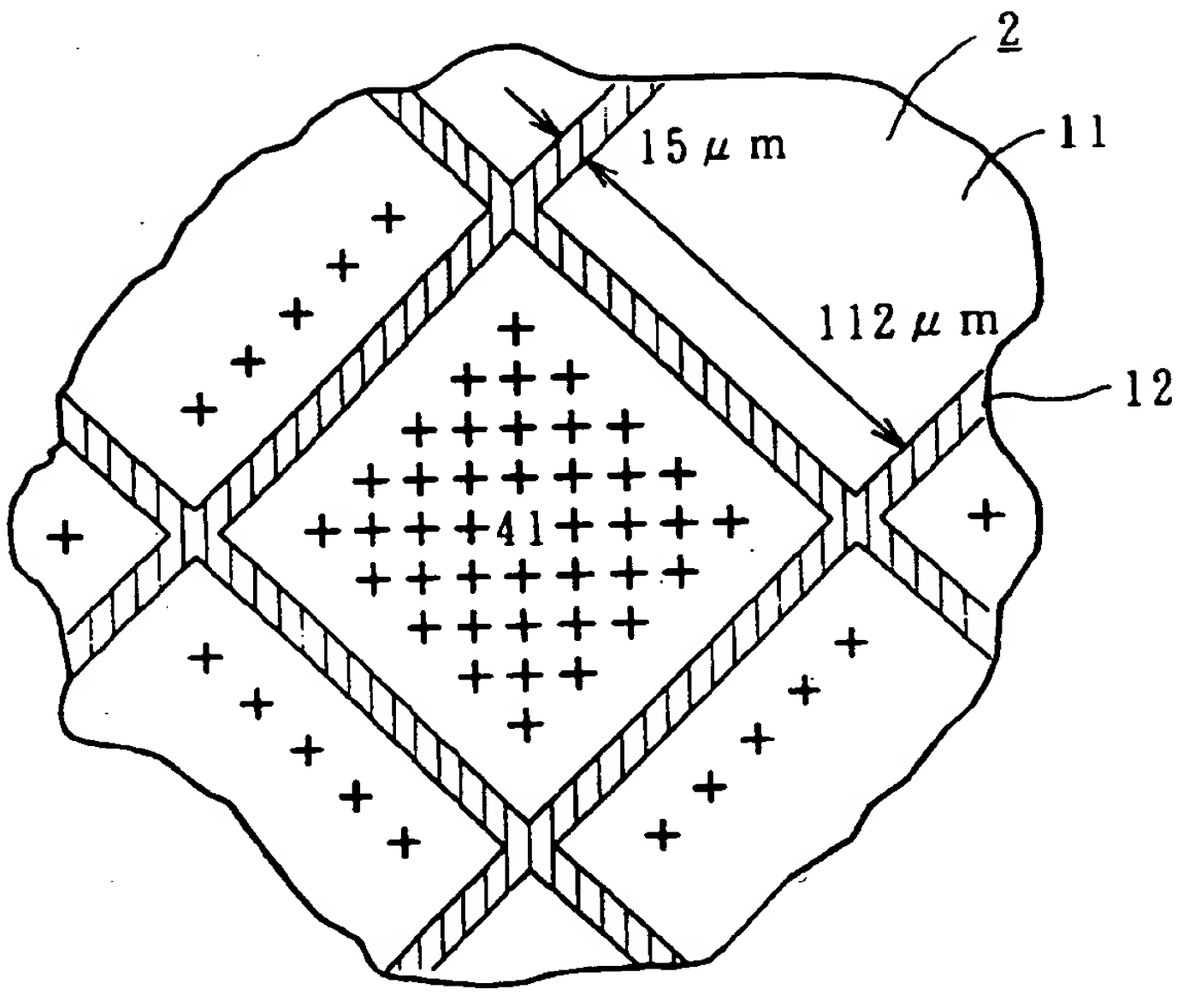


Fig. 4

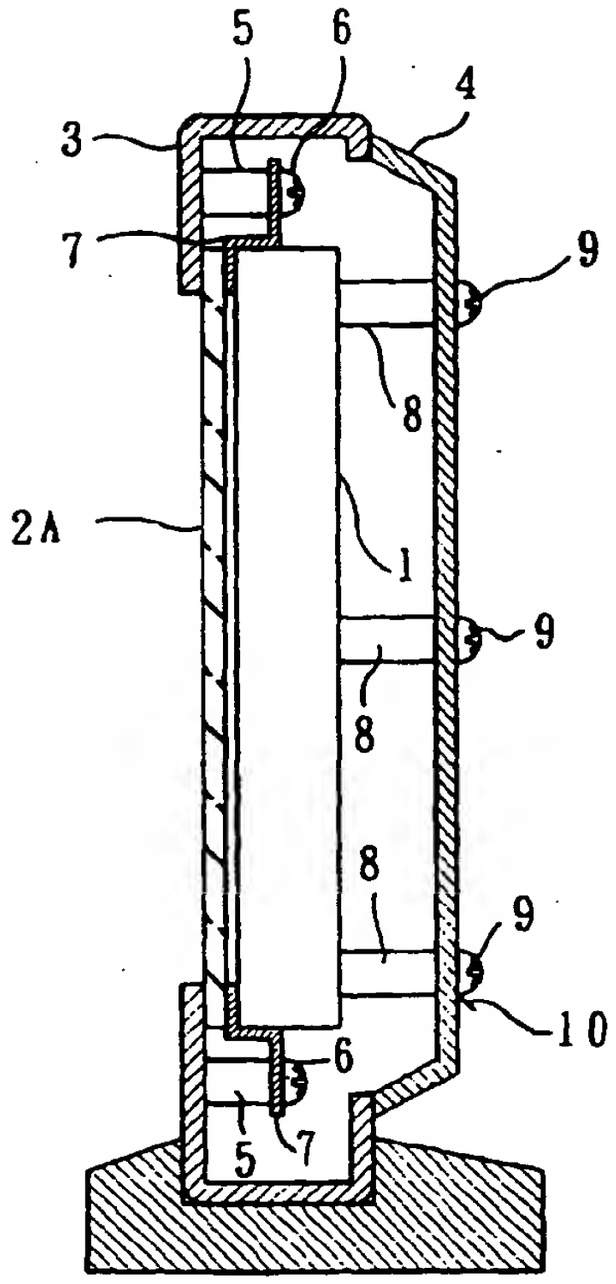



Fig. 5

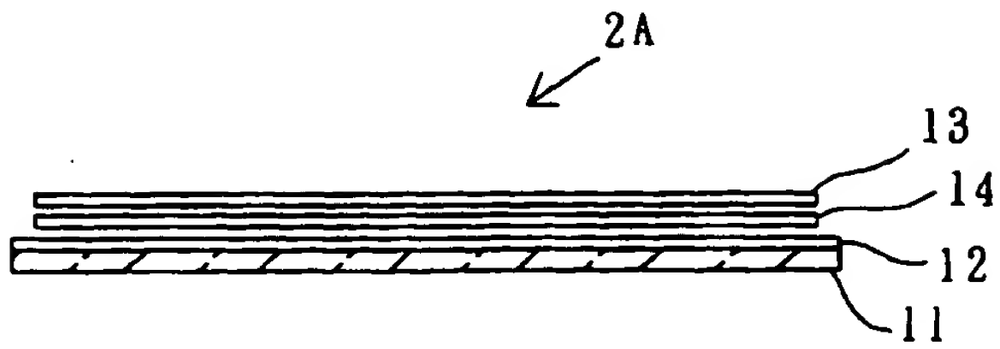


Fig. 6

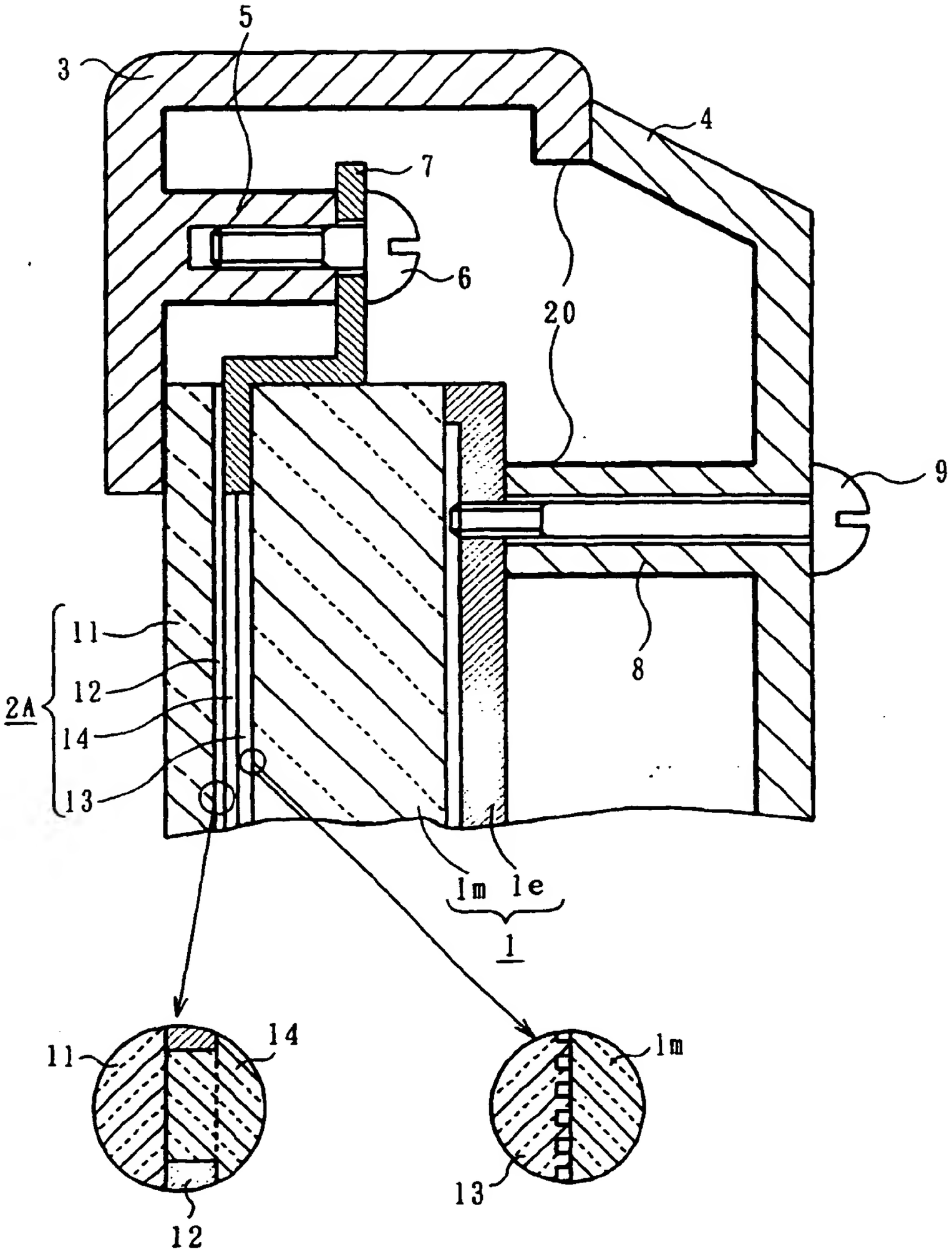


Fig. 7

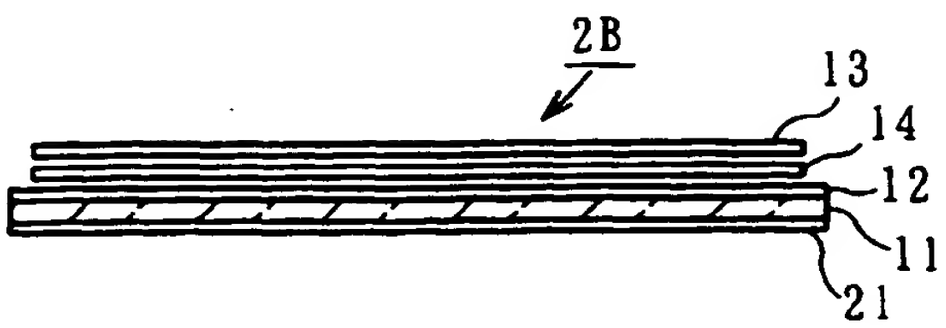



Fig. 8

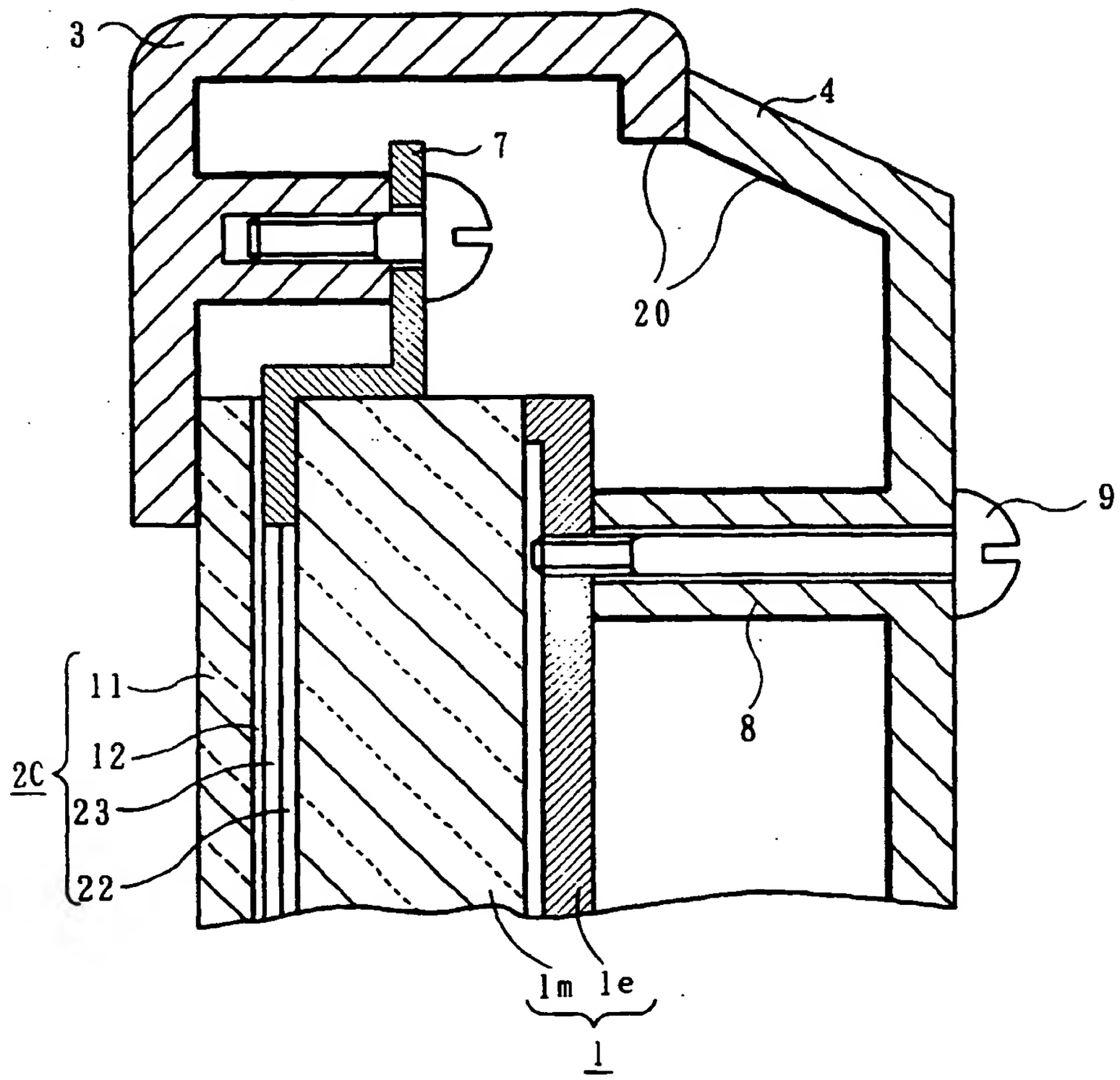


Fig. 9

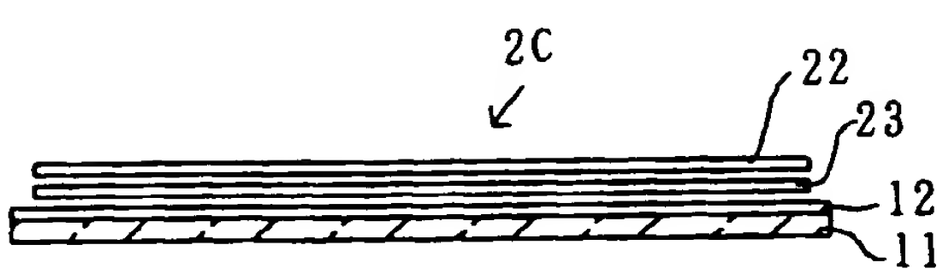



Fig. 10

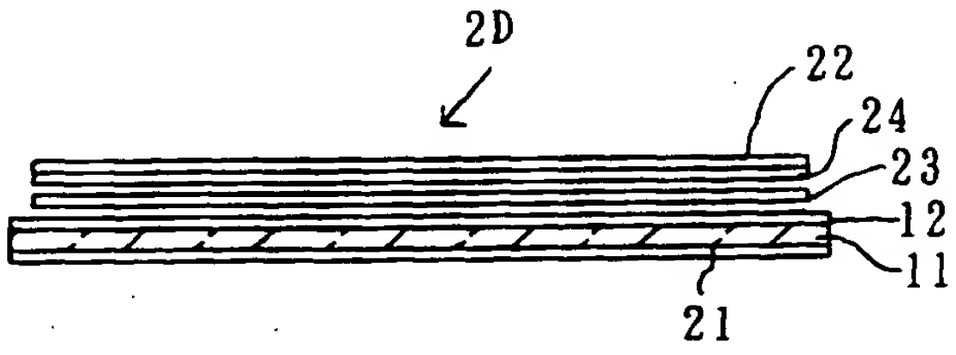
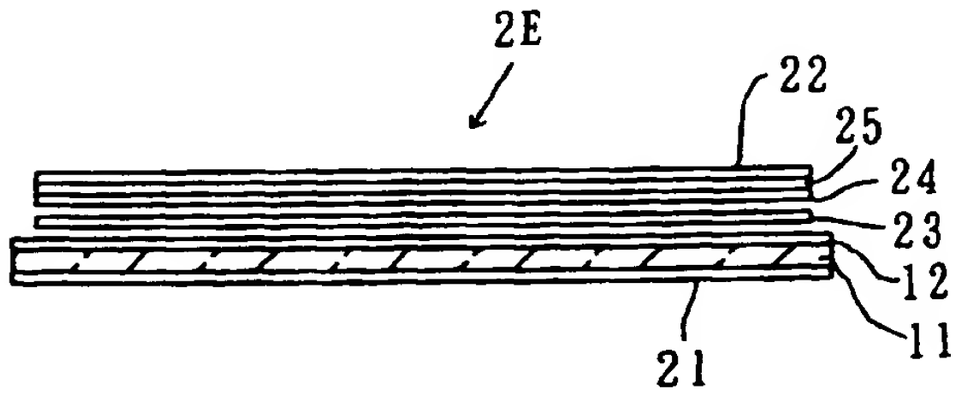



Fig. 11



# INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP96/03123

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl$^6$ H01J11/02, 17/16, 29/88, 29/89, H05K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl$^6$ H01J11/02, 17/16, 29/88, 29/89, H05K9/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1926 - 1996 Jitsuyo Shinan Toroku Koho 1996 - 1997
Kokai Jitsuyo Shinan Koho 1971 - 1997
Toroku Jitsuyo Shinan Koho 1994 - 1997

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | Microfilm of the specification and drawings annexed to the written application of Japanese Utility Model Application No. 88273/1986 (Laid-open No. 199999/1987)(Kamaya Kagaku Kogyo K.K.), December 19, 1987 (19. 12. 87), Page 6, lines 1 to 20; page 7, lines 1 to 12; page 10, lines 19 to 20; page 11, lines 1 to 8; Fig. 10 | 5 |
| Y | Page 7, lines 13 to 20; page 8, lines 1 to 16; Fig. 6 | 6, 7 |
| Y | Page 6, lines 1 to 20; page 7, lines 1 to 12; Figs. 3, 4 (Family: none) | 1, 2 |
| Y | JP, 8-55581, A (Fujitsu General Ltd.), February 27, 1996 (27. 02. 96), Paragraphs (0014) to (0016); Fig. 1 (Family: none) | 3, 9 |
| Y | JP, 5-283889, A (Nissha Printing Co., Ltd.), October 29, 1993 (29. 10. 93), | 4 |

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| January 21, 1997 (21. 01. 97) | January 28, 1997 (28. 01. 97) |
| Name and mailing address of the ISA/ Japanese Patent Office | Authorized officer |
| Facsimile No. | Telephone No. |

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**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP96/03123

C (Continuation): DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| | Paragraphs (0022) to (0025); Fig. 2<br>(Family: none) | |

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